

## Method 2: Given vertex and a point

Example: Write the equation of the quadratic function with a vertex of  $(-2, 3)$  through the point  $(1, 9)$

4 min Use vertex form:  $y = a(x-h)^2 + k$ , because I was given vertex

$$y = a(x+2)^2 + 3$$

plug vertex in for  $(h, k)$

$$9 = a(1+2)^2 + 3$$

plug in  $x$  and  $y$  from point

$$9 = a(3)^2 + 3$$

$$9 = 9a + 3$$

$$6 = 9a$$

simplify + solve for  $a$

$$a = \frac{6}{9} = \frac{2}{3}$$

$$y = \frac{2}{3}(x+2)^2 + 3$$

plug in  $a$

You Do

3 min 1) Vertex  $(1, 6)$  through  $(3, 20)$

$$y = a(x-h)^2 + k$$

$$y = a(x-1)^2 + 6$$

$$20 = a(3-1)^2 + 6$$

$$20 = a(2)^2 + 6$$

$$20 = 4a + 6$$

$$\frac{14}{4} = \frac{4a}{4}$$

$$a = \frac{14}{4} = 3.5$$

$$y = 3.5(x-1)^2 + 6$$

2) Vertex  $(-4, -1)$  through  $(0, 15)$   
 $x=0$   
y-intercept!